

WHAT IS CLAIMED IS:

1. A pattern formation member adopted to
a sectioning image observation apparatus which
selectively irradiates a light from a light source to
5 a sample, scans said sample, and acquires a light from
said sample as a sectioning image, wherein

said pattern formation member comprises
an irradiation section and a cutoff section,
each of said irradiation section and said cutoff
10 section is in a straight pattern, and
these straight patterns are disposed
alternatively.

2. The pattern formation member according to
claim 1, wherein

15 said pattern formation member is a rotation disk
such that said irradiation section is a translucent
section to pass a light and said cutoff section is
a shield section to shield a light,

said rotation disk is rotated on a light path,
20 each of patterns to scan said sample by the
light passing through said rotation disk is formed in
a straight pattern, and

these patterns are disposed alternatively.

3. The pattern formation member according to
25 claim 1, wherein

a width of the straight pattern of said shield
section is larger than that of said translucent

section.

4. The pattern formation member according to
claim 1, wherein

said pattern formation member is a digital
5 micro mirror having a plurality of mirrors, whose
directions are independently changeable, disposed in
a two-dimensional form.

5. A pattern formation member, according to
claim 3, wherein said rotation disk is divided into
10 a plurality of areas and a pattern of each of said
plurality of areas is different.

6. The pattern formation member according to
claim 5, wherein

said plurality of areas are located on concentric
15 circles and each of them has different straight
patterns.

7. A sectioning image observation apparatus which
scans a sample with a light by using a pattern
formation member described in claim 1, and acquires a
20 reflected light from said sample as a sectioning image
through said pattern formation member.

8. The sectioning image observation apparatus
according to claim 7, further comprising a moving
mechanism to change projection position on said
25 rotation disk to said sample.

9. A sectioning image observation apparatus which
enters an excited light with a predetermined wavelength

through an excitation filter to a pattern formation member described in claim 1, scans a sample with a light by using said pattern formation member, and acquires a fluorescence emitted from said sample as a sectioning image through said pattern formation member and a barrier filter selecting a wavelength of the emitted fluorescence.

10. A sectioning image observation apparatus comprising:

10 a light source;

a rotation disk having a pattern in which a slit translucent section which passes a light and a straight shading section which shields a light, are alternately and periodically arranged;

15 means to lead a light from said light source to said rotation disk;

means to irradiate a light passing said rotation disk to a sample and project a pattern of said rotation disk to the sample;

20 an optical lens which projects a light reflected from said sample on said rotation disk; and

means to rotate said rotation disk on an optical path, scan the pattern of said rotation disk projected on the said sample, and acquires an image 25 passing said rotation disk as an sectioning image among sample images projected on said rotation disk, wherein

when an angle of said rotation disk surface and
a surface normal to an optical axis is θ , an aperture
of said lens from said sample is NA, an expansion rate
of a sample image projected on said rotation disk is M,
5 a diameter (called as a number of view) on said
rotation disk in an area of the observed sample is R,
an angle between a main light beam which passes at an
outermost edge of a diameter on said rotation disk of
the observed sample area and an optical axis is ϕ , and
10 a wavelength of the light is λ , at least one of the
following conditions are satisfied:

$$\theta > \phi + 2NA/M, \text{ and}$$

$$\theta < \frac{M^2\lambda}{NA^2R}.$$

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11. The pattern formation member according to
claim 2, wherein

20 a shield area is formed at a portion to which
straight patterns of said translucent section and said
shield section of said rotation disk is parallel to a
scanning direction according to a rotation of said
rotation disk in an observation field.

12. The pattern formation member according to
claim 5, wherein

25 said plurality of areas have a plurality of sector
shaped areas divided in a circumferential direction of
said rotation disk.

13. The pattern formation member according to

claim 5, wherein

 said plurality of divided areas are different direction areas of the straight patterns having different direction of said translucent section and
5 said shield section not to be parallel to a scanning direction according to a rotation of said rotation disk in an observation field.

14. The pattern formation member according to claim 13, wherein

10 said different direction areas have a plurality of sector shaped areas each having a predetermined central angle, and

 the straight pattern in said different direction areas are another straight pattern area of said
15 translucent section and said shield section with sector shape area.

15. The pattern formation member according to claim 13, wherein

20 each of said different direction areas has a predetermined width, and

 the straight patterns in each of said different direction areas are straight patterns of said translucent section and said shield section having different direction from the straight pattern of the
25 other areas.

16. The pattern formation member according to claim 6, wherein at least two patterns of said

plurality of areas have patterns having different ratios of a width of said shield section and that of said translucent section.

17. The pattern formation member according to
5 claim 16, wherein

a width of a straight portion of said translucent section is substantially constant.

18. The pattern formation member according to
claim 17, further comprising

10 a plurality of areas having different direction of said translucent section and said shield section of the straight pattern of said rotation disk.

19. The pattern formation member according to
claim 18, further comprising different direction areas
15 on portions parallel to a scanning direction according to a rotation of said rotation disk in an observation field in the straight patterns, wherein

the straight patterns in each of said different direction areas are straight patterns of said translucent section and said shield section having different direction from the straight pattern of the other areas.

20. The pattern formation member according to
claim 19, wherein

25 when a width of different direction area having a constant width is X and a period of said translucent section and said shield section is W in said rotation

disk, X/W is constant.

21. The pattern formation member according to
claim 20, wherein

when said translucent section of said least two
5 concentric circle areas have a same width and a period
W of said translucent section and said shield section
is different,

10 a period W of said translucent section and said
shield section on an inner concentric circle area is
smaller than that of an outer concentric circle area,
and

a width X of a different direction area of inner
and outer concentric circle areas is proportional to
the period W.

15 22. The pattern formation member according to
claim 6, wherein

20 at least two pattern of said plurality of areas
have an equal ratio of a width of said translucent
section and that of said shield section, and widths of
said translucent section and said shield section are
different for each of said areas.

25 23. The pattern formation member according to
claim 22, further comprising different direction areas
on portions parallel to a scanning direction according
to a rotation of said rotation disk in an observation
field in the straight patterns, wherein

the straight patterns in each of said different

direction areas are straight patterns of said translucent section and said shield section having different direction from the straight pattern of the other areas.

- 5 24. The pattern formation member according to claim 23, wherein

when a width of different direction area having a constant width is X and a period of said translucent section and said shield section is W in said rotation disk, X/W is constant.

- 10 25. The pattern formation member according to claim 24, wherein

at least two areas in which said translucent section and said shield section have same width are located so that a period W of said translucent section and said shield section on an inner concentric circle area is smaller than that of an outer concentric circle area, and

20 a size of the width of different direction area in the inner concentric circle areas is smaller than a size of the width of different direction area in the outer concentric circle areas.